Space Weather Forecast

Issued on Monday, 25 April 2022 at 13:28 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate-class flares (R1/R2 Radio Blackouts), with a slight chance of Strong flares (R3 Radio Blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with two Moderate-class flares being observed at 25/0200 UTC and 25/0402 UTC. There are currently six sunspot regions on the disc, the largest and most prominent of these being two regions close together in the northwest of the disc. Both are large regions with some magnetic complexity, and as such these make up the majority of the flare risk at the present time, with the northernmost region responsible for the two M-flares. All other regions are smaller and simpler, although a region northeast of centre disc has shown some development, and regions near the southeast limb have given some recent (non-Earth directed) CME (Coronal Mass Ejection) activity. A prolonged flare signature was observed during the 25/0200 UTC M1 flare, however no CME has been visible in the available imagery, and thus no Earth-directed CMEs were observed during the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind has been largely unremarkable, although with slightly elevated wind speeds suggesting perhaps a weak connection to the fast wind of a coronal hole. Solar wind speeds have been mostly at slightly elevated levels, varying between 420 km/s and 500 km/s. The Interplanetary Magnetic Field strength has been weak, with the north-south component varying weakly. Geomagnetic activity was Quiet (Kp 0-2) throughout.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar Activity is currently Moderate, with a chance of further Moderate-class flares through the period and a slight chance of an isolated Strong flare. The northwest quadrant is the most likely source for this activity, as two relatively large and complex sunspot regions continue to transit across the disc, although further regions may also rotate round the southeast limb over the coming days.

Solar Wind / Geomagnetic Activity: A CME which left the Sun on the 21st was forecast to pass Earth's orbit late on 24 April, with a slight chance of a glancing interaction. There remains a continuing but declining risk through day 1 (25th) that Earth may see a glancing blow from this feature. The current slightly elevated wind speeds are expected to decrease towards ambient levels through day 1 (25th) into day 2 (26th) as coronal hole fast wind effects wane. No further sources of enhancement are expected during this period at the current time. Geomagnetic activity is forecast to be mostly Quiet through this period, with isolated Unsettled spells. There is a chance of Active intervals, with a very slight chance of a minor geomagnetic storm on day 1 (25th) and late on day 4 (28th).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is most likely to remain at background levels with no solar radiation storms occurring. However, there is a slight chance of solar radiation storms, as the complex sunspot regions in

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the northwest of the visible disc are now in a position where any energetic particles that can be released during larger flares may reach Earth.

Geomagnetic Storms:

Geo-Magnetic Storm / Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	1	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares / Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	50	50	60	60
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms / Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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